

REMARKS

This responds to the Office Action mailed on June 28, 2006.

Claims 1, 12-15, 20, 22, 25, and 28 are amended, claims 11, 24, 27, and 29 are canceled, and no claims are added; as a result, claims 1-10, 12-23, 25-26, 28, and 30 are now pending in this application.

Interview Summary

Applicant thanks Examiner Kevin Y. Kim for the courtesy of a telephone interview on September 21, 2006 with Applicant's representative Bruce E. Houston. Mr. Houston faxed the instant amendment to Examiner Kim for review. Examiner Kim and Mr. Houston then discussed the amendment by telephone. Examiner Kim indicated that all claims appear allowable with the possible exception of claim 15, and that claim 15 would be allowable if the limitation of claim 20 were to be included in claim 15. Otherwise, Examiner Kim would need to look at amended claim 15 more closely. [The proposed claim 15 incorporates "wherein determining a reduced alphabet includes determining an alphabet of size K, where K is a positive integer..." (the latter limitation previously in claim 20). However, the limitation "redetermining K for successive input symbols within said communication channel" remains in claim 20.] Mr. Houston agreed to consider this and to submit the response.

Post-interview Note and Argument. Applicant notes that the limitation "redetermining K for successive input symbols within said communication channel" in currently amended claim 20 depending from independent claim 15 is analogous to the limitation in currently amended claim 12 depending from independent claim 1, "wherein said alphabet determination unit determines a value for K on an input symbol by input symbol basis." The Examiner indicated in the interview that claim 1 is allowable. If claim 1 is allowable without the limitation "wherein said alphabet determination unit determines a value for K on an input symbol by input symbol basis," then claim 15 should be allowable without the analogous limitation, "redetermining K for successive input symbols within said communication channel."

§103 Rejection of the Claims

Claims 1-10, 15-19, 21-23, 25, 26, 28 and 30 were rejected under 35 USC § 103(a) as being unpatentable over Gonikberg (U.S. 6,618,451) in view of Riess et al. (U.S. 2002/0007257, hereinafter “Riess”). Applicants do not admit that either Gonikberg or Riess is prior art, and reserve the right to swear behind these references in the future.

The Office bears the burden under 35 U.S.C. § 103 of establishing a *prima facie* case of obviousness. *In re Fine*, 837 F.2d 1071, 1074, 5 U.S.P.Q.2d (BNA) 1596, 1598 (Fed. Cir. 1988). The M.P.E.P. directs the Examiner in accordance with the *In re Fine* court:

In order for the Examiner to establish a *prima facie* case of obviousness, three base criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *M.P.E.P.* § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d (BNA) 1438 (Fed. Cir. 1991)).

The requirement of a suggestion or motivation to combine references in a *prima facie* case of obviousness is emphasized in the Federal Circuit opinion, *In re Sang Su Lee*, 277 F.3d 1338, 61 U.S.P.Q.2D 1430 (Fed. Cir. 2002), which indicates that the motivation must be supported by evidence in the record.

Claim 1 is amended to contain all of the limitations of allowable claim 11, as follows:

An equalization system comprising:

- a first equalizer to process a communication signal received from a communication channel to generate an output;
- a reduced alphabet determination unit to identify a reduced alphabet having K symbols where K is a positive integer, the reduced alphabet based on said output of said first equalizer; ~~and~~
- an alphabet length determination unit for determining a value for K based on an output of said first equalizer; and
- a reduced alphabet MLSE equalizer to detect data in said communication signal received from said communication channel based on said reduced alphabet identified by said reduced alphabet determination unit.

As amended, claim 1 does not meet the *M.P.E.P.* § 2142 criteria for obviousness. That is, the references do not teach or suggest all the claim limitations. Amended claim 1 is thought to be allowable for at least these reasons.

Rejected claims 2-10 depend from claim 1. A claim depending from an unobvious claim is not obvious at least because the combined references do not teach all of the claim limitations. *See M.P.E.P.* § 2142. Rejected claims 1-10 are thought to be allowable for at least these reasons; and confirmation to that effect is earnestly requested.

Claim 15 is amended to contain the limitation of allowable claim 20 reciting that the reduced alphabet is of size K and that K is a positive integer, as follows:

A method for performing equalization within a communication system,
comprising:

first processing a communication signal using a first equalizer;
determining a reduced alphabet based on a result of said first processing,
wherein the reduced alphabet is of size K and wherein K is a positive integer;
and

second processing said communication signal using a reduced alphabet
MLSE equalizer, said reduced alphabet MLSE equalizer operating on said
communication signal based on said reduced alphabet.

This additional method limitation in amended claim 20 tracks the additional structural limitation added to amended claim 1 to cause amended claim 1 to read as allowable claim 11. The additional limitation of “redetermining K for successive input symbols within said communication signal” is retained in claim 20. Amended claim 15 is thought to be allowable for at least these reasons.

Rejected claims 16-19 and 21, together with amended claim 20, depend from claim 15. A claim depending from an unobvious claim is not obvious, at least because the combined references do not teach all of the claim limitations. *See M.P.E.P.* § 2142. Claims 15-21 are thought to be allowable for at least these reasons; and confirmation to that effect is earnestly requested.

Claim 22 is amended to contain all of the limitations of allowable claim 24, as follows:

A computer readable medium having program instructions stored thereon
for implementing, when executed within a digital processing device, a method for
performing equalization within a communication system, said method
comprising:

first processing a communication signal using a first equalizer;

determining a reduced alphabet based on a result of said first processing; and wherein a size of the reduced alphabet is related to at least one of a symbol probability determined during first processing or a coding distance determined during first processing; and

second processing said communication signal using a reduced alphabet MLSE equalizer, said reduced alphabet MLSE equalizer operating on said communication signal based on said reduced alphabet.

As amended, claim 22 does not meet the *M.P.E.P.* § 2142 criteria for obviousness. That is, the references do not teach or suggest all the claim limitations. Amended claim 22 is thought to be allowable for at least these reasons.

Rejected claim 23 depends from claim 22. A claim depending from an unobvious claim is not obvious, at least because the combined references do not teach all of the claim limitations. See *M.P.E.P.* § 2142. Rejected claims 22 and 23 are thought to be allowable for at least these reasons; and confirmation to that effect is earnestly requested.

Claim 25 is amended to contain all of the limitations of allowable claim 27, as follows:

An equalization system comprising:
a reduced state, full-alphabet MLSE equalizer to process a communication signal received from a communication channel to generate a plurality of soft symbols for a first input symbol within said communication signal, said plurality of soft symbols having corresponding symbol probabilities;
a symbol selection unit to select symbols from said plurality of soft symbols to form a reduced alphabet of size K for said first input symbol; and
an alphabet size determination unit to determine a value for K for each input symbol within said communication signal based on symbol probabilities output by said reduced state, full-alphabet MLSE equalizer; and
a full-state, reduced alphabet MLSE equalizer to process said communication signal based on said reduced alphabet.

As amended, claim 25 does not meet the *M.P.E.P.* § 2142 criteria for obviousness. That is, the references do not teach or suggest all the claim limitations. Amended claim 25 is thought to be allowable for at least these reasons.

Rejected claim 26 depends from claim 25. A claim depending from an unobvious claim is not obvious, at least because the combined references do not teach all of the claim limitations. See *M.P.E.P.* § 2142. Rejected claims 25 and 26 are thought to be allowable for at least these reasons; and confirmation to that effect is earnestly requested.

Claim 28 is amended to contain all of the limitations of allowable claim 29, as follows:

A communication device, comprising:

means for receiving a communication signal from a communication channel, said communication signal including undetected input symbols selected from a full symbol alphabet;

means for determining, for individual input symbols within said communication signal, a reduced symbol alphabet having symbols that are more likely to be an actual transmitted symbol than other symbols within said full symbol alphabet, wherein said means for determining includes means for dynamically adjusting a size of said reduced symbol alphabet for successive input symbols within said communication signal; and

a full-state MLSE equalizer for processing said communication signal based on said reduced symbol alphabet.

As amended, claim 28 does not meet the *M.P.E.P.* § 2142 criteria for obviousness. That is, the references do not teach or suggest all the claim limitations. Amended claim 28 is thought to be allowable for at least these reasons.

Rejected claim 30 depends from claim 28. A claim depending from an unobvious claim is not obvious, at least because the combined references do not teach all of the claim limitations. *See M.P.E.P.* § 2142. Rejected claims 28 and 30 are thought to be allowable for at least these reasons; and confirmation to that effect is earnestly requested.

Regarding claims 4-8, 16, and 30, the Office states that “[t]he claimed type of equalizers are well known equalizers and thus would have been an obvious matter of design choice for the partial response equalizer (219).” Because no reference is cited by this proposition, it appears that the Examiner may be using personal knowledge for the assertion. An affidavit as required by 37 C.F.R. § 1.104(d)(2) is respectfully requested.

Allowable Subject Matter

Claims 11-14, 20, 24, 27 and 29 were objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The limitations of allowable claim 11, depending directly from claim 1, are moved to amended claim 1, as previously described. Applicants believe that claim 1 is allowable for at least the same reasons that the Office cites for claim 11. Claim 11 is canceled. Claims 12-14 are believed to be allowable at least because they depend from claim 1.

Some of the limitations of claim 20 are moved to amended claim 15, as previously described. Applicants believe that claim 15 is allowable for at least the same reasons that the

Office cites for claim 20. Claim 20 is amended to include a limitation of original claim 20 that was not transferred to amended claim 15. Claim 20 is believed to be allowable because it depended from claim 15 that is thought to be allowable for at least these reasons.

The limitations of allowable claim 24, depending directly from claim 22, are moved to amended claim 22, as previously described. Applicants believe that claim 22 is allowable for at least the same reasons that the Office cites for claim 24. Claim 24 is canceled.

The limitations of allowable claim 27, depending directly from claim 25, are moved to amended claim 25, as previously described. Applicants believe that claim 25 is allowable for at least the same reasons that the Office cites for claim 27. Claim 27 is canceled.

The limitations of allowable claim 29, depending directly from claim 28, are moved to amended claim 28, as previously described. Applicants believe that claim 28 is allowable for at least the same reasons that the Office cites for claim 29. Claim 29 is canceled.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney, Bruce Houston, at 210-892-0437 x221 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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